Book Reviews

Complexities of Human Development

The Psychology of Sex Differences. ELEANOR EMMONS MACCOBY and CAROL NAGY JACKLIN. Stanford University Press, Stanford, Calif., 1974. xvi, 634 pp. $18.95.

Adopting the skeptical premise that an empirical finding is not to be trusted until demonstrated time and time again, the authors of this book conduct a vigorous search for robust conclusions on the nature and origins of psychological sex differences. A wide net is cast. The topics dealt with include perception, learning, memory, intellectual abilities, cognitive styles, achievement motivation, self-concept, social behaviors, sex typing, modeling, and socialization practices. Within each of these areas recent research studies are assembled, annotated, reviewed critically, tallied in a kind of box score, and finally judged with regard to the primary question—whether a reliable sex difference on the attribute or process under scrutiny has or has not been established. Along the way we learn a good deal about how value-laden assumptions inadvertently become part of the scientific fabric, permeating measurement, analysis, and inference and posing serious obstacles to objective discernment. The resulting yields of substantiated facts (and exposed fictions) are treated as delimited phenomena worthy of further explanation. Attention is given to biological, psychological, and social mechanisms that might account for the acquisition and maintenance of actual sex differences in behavior as well as for the perpetuation of unsubstantiated myths. The analyses note strengths and weaknesses of contending theories, offer possible leads for further inquiry, and spell out implications for social policy. All of this is done with such skill and balanced judgment that we are led in the end to venture with the authors beyond the constraints of the skepticism in which the whole enterprise was rooted.

This book does much to fill a long-standing void, but it can serve only as a way station in the continual process of clarifying and updating the psychology of sex differences. The dual dangers exist that too much will be expected of the book and too little will be taken from it. Specialists undoubtedly will perceive errors of fact, inference, or omission. To be sure, the authors conscientiously discuss the pitfalls of their approach, and their procedures enhance the chances of arriving at sound conclusions. Nevertheless, this is risky business; small errors can accumulate and can amount to rather large hazards, especially when a work is destined, as this one is, to be used both by scholars and by policy-makers as a major source—if not the authoritative source—of established knowledge on its subject. Already *The Psychology of Sex Differences* has stimulated controversy in scientific quarters, spurring others, one hopes, to carry out analyses of greater depth. Interestingly, the authors themselves complain of a "primacy" effect in which a dramatic finding on a behavioral sex difference rapidly becomes widely disseminated, only to be followed by disconfirming studies which remain buried in the scientific archives. Since this book also constitutes the first of its kind, it too could set in motion the very process the authors deplore. One hopes that the irony of this possibility will goad them into providing future revisions.

The related danger, less easily avoided, is that the thirst for authoritative knowledge in this field may tempt readers to attribute greater certainty to conclusions than was intended. Obviously it is unfair to blame writers for abuse of their work by readers, especially when the particular abuse at issue is so effectively neutralized by the way the authors go about their task. Nevertheless, a book of this type remains easy prey for those who thoughtlessly seek only a catalog of scientifically "respectable" answers. The great pity here would be that so much more is to be gained by following the arguments in their entirety.

Consider the authors' treatment of aggression, one of the few areas for which the authors judge that a genuine difference between the sexes has been demonstrated.

> The sex difference in aggression has been observed in all cultures in which the relevant behavior has been observed. Boys are more aggressive both physically and verbally. They show the attenuated forms of aggression (mock-fighting, aggressive fantasies) as well as the direct forms more frequently than girls. The sex difference is found as early as social play begins—at age 2 or 2½. Although the aggressiveness of both sexes declines with age, boys and men remain more aggressive through the college years. Little information is available for older adults. The primary victims of male aggression are other males—from early ages, girls are chosen less often as victims [p. 352].

Such conclusions, summarized in the final chapter, need to be considered within the rich context of findings and discussion found elsewhere in the book. In the case of aggression, a long-standing question is posed: is the observed sex difference based upon differences in quantity or upon differences in mode of expression? Little direct or indirect evidence is found for a sex difference in the manner of expressing aggression. For example, girls do not clearly experience greater anxiety about their aggressive tendencies than boys, and girls are not more likely to displace their aggression onto safe targets. As a matter of fact, boys are known to receive as much punishment for aggression as do girls (and probably more). Little evidence for the differential expression hypothesis having been found, the possibility of a quantitative sex difference based upon differential learning is critically examined. Although boys are somewhat more likely to learn aggressive responses by social imitation, girls also learn aggression by the same means and have ample opportunity to do so. And, for both conceptual and empirical reasons, it is difficult if not impossible to trace precisely how differential social reinforcements of aggression in the sexes eventuate in the observed sex difference.

The analysis then turns to a biological explanation, favored by the authors. Without denying that learning plays a role, the authors review evidence (including that on relationships between sex hormones and aggression) supporting the view that males more than females are biologically primed to respond aggressively. Adopting this conclusion as a guiding hypothesis, they then consider other social behaviors related to aggression (for example, competition and dominance), but sex differences in these areas are found to be less general and quite dependent upon context and age. In the end, therefore, the authors distinguish between aggression per se, for which the biological explanation appears to apply, and a variety of related social behaviors, for which complex patterns of social learning seem heavily implicated, though they are not yet fully understood. This distinction becomes a key factor in later discussion of implications for social policy. Because interpersonal aggression generally is dysfunctional, especially when it fails to be subordinated to institutionalized patterns of dominance, leadership, affection, bargaining, and achievement, even this biologically based sex difference does not warrant assignment of the sexes to different places in society.

The line of argument varies from topic to topic, but it is always illuminating and often quite persuasive. In addition to biological explanations and those based upon

social learning theories of imitation and reinforcement stressed by Bandura and Mischel, the authors draw upon Kohlberg's theory on the central role of developing cognitive structures. Each theory is seen to have its place, often in combination, blended to account for the facts at hand. It is refreshing to see diverse perspectives used in this way to construct explanations of delimited phenomena. But some theorists will be troubled by this work's eclecticism, and it remains for future studies to reveal which of the authors' many constructions are correct.

The authors call for a liberalized reinterpretation of the specific tasks of sex-role socialization. The knowledge base is shown to justify past and projected future reductions of sex-role specialization within our society. Quite properly the authors emphasize the importance of developing many similar competencies in both sexes as well as preventing or neutralizing sex-role differentiations known to be dysfunctional. Research has an important role to play in documenting the future course of these secular trends.

Certain issues dealt with informally in this volume might well become central topics in future works. More systematic attention could be given to variations in sex-role differentiations (and their socialization) among cultures, social classes, and ethnic groups. There is also continuing interest in how the residuals of traditional norms continue to operate within modern society, however subtly. One promising approach to this issue can be seen in the authors' sensitive treatment of situational factors as elicitors of sex differences in behavior. In addition, traditional patterns of sex-role specialization are increasingly perceived as options rather than as requirements. Greater attention could be given to the psychological and sociological implications of these choices, and to the circumstances under which this kind of voluntarism reverts back to necessity. In examining such questions developmentally, box-score tallies of average differences between the sexes on psychological attributes would be supplemented and perhaps even supplanted by other kinds of evidence, including experimental and naturalistic findings on how gender alters functional relationships between critical experiences and behavior at various periods of the life cycle.

This work exposes but does not fully resolve a basic theoretical problem for the psychology of sex differences. Theories of socialization postulate general mechanisms of cultural transmission from society to child. A major reason for investigating the origins of behavioral sex differences has been to test one or another general theory of the socialization process. Prominent theories have not stood up well in this respect, however. Behavioral differences between the sexes appear to be so limited, so dependent upon subtle features of the eliciting context, and so specific to certain age periods, and to have such diverse patterns of determinants, that no existing theory of cultural transmission can possibly handle the explanatory burden. While it was once widely believed that social learning mechanisms would explain major features of early socialization, that hope remains unfulfilled in this area. And since much of sex-role development appears to involve qualitative shifts in psychological organization, rather than cumulating behavioral changes with age, the idea of a society continuously inducing its children and youth to adopt a common core of sex-differentiated norms becomes highly questionable.

When one considers that many traditional lines of sex-role specialization are breaking down in modern society, it comes as no surprise that reliable sex differences in behavior are so difficult to establish, or that sex-differentiated socialization practices during childhood are so limited in scope, or that functional relationships between these two classes of variables generally are so weak. To be sure, traditional sex-role differentiations continue to pervade our society, but strong evidence for their direct and continuous transmission from one generation to the next is quite rare. The weak transmission processes which remain in this area appear to be the vestiges of past eras, when behavioral specialization by gender did serve vital functions for society.

Actually, such difficulties in establishing strong connections between childhood experience and later behavior extend well beyond the area of sex-role development, raising even broader questions about the nature of socialization processes. Many students of human development have moved beyond the idea of society shaping its young in its own image and are investigating how the individual actively transforms cultural patterns throughout the life cycle. As this volume partially documents, the child's own developing dispositions and capacities (biologically primed tendencies, cognitive processes, linguistic skills, and so on) markedly influence how the child selects, organizes, and acts upon cultural messages and how, in turn, socializing agents respond to the child. This shift in thinking about socialization could revitalize theoretical interest in the psychology of sex differences.

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Differentiation

Cell Patterning. Proceedings of a symposium, London, May 1974. Associated Scientific Publishers (Elsevier, Excerpta Medica, North-Holland), New York, 1975. viii, 356 pp., illus. $26.95. Ciba Foundation Symposium 29 (new series).

This volume consists of contributions to a symposium on pattern formation in a variety of animal systems. The papers include both reviews of and new information on the genesis and control of patterns in material ranging from ciliate protozoa to insect embryos and epidermal cells to the vertebrate retina. Some of the most interesting ideas come to light in the general discussions following each paper. About one-third of the space is occupied by these discussions, which form a disconnected discourse in which the current issues and ideologies of developmental biology contend.

Many authors interpret their observations in the framework provided by Wolpert's theory of positional information. According to this model, each cell in a developing system acquires a unique positional value that determines its fate at differentiation. Chemical gradients provide a parsimonious means of generating positional information, and a number of contributions illustrate the operational criteria currently used to detect them. Hunt shows by transplantation experiments that specification of the major axes of the *Xenopus* retina can take place outside the orbit. Thus the spatial cues from which the retina derives polarity come from a global system that pervades the embryo. Other evidence for gradients comes from the mirror image patterns observed by Bryant in experiments with regenerating *Drosophila* wing disk fragments and from Sander's review of his work on ligated insect embryos. Although convincing gradient models can be devised to account for particular results, they are not susceptible to direct test as long as the outcome of differentiation is the only means of assaying gradient level. Unfortunately, an account of current progress in the chemical characterization of gradients active in regeneration in *Hydra* is not included.

If the information passed between cells is as simple as position in a coordinate system, then the mechanisms mediating its interpretation as a pattern of gene activity must be quite complex to account for the variety of response. The most promising attack on this problem is at present genetic, and it is best developed in *Drosophila*. Two papers by Garcia-Bellido and Kauffman exemplify this approach at its most incisive. These authors argue from differ-